



Naval Support Activity Memphis (formerly Naval Air Station Memphis) Millington, Tennessee

Fact Sheet 10

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This is one in a series of fact sheets informing interested residents about the environmental program at Naval Support Activity (NSA) Memphis. Distribution is coordinated through the NSA Memphis Public Affairs Office at (901) 874-5761.

The Corrective Measures Study

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A Corrective Measures Study is one stage in the investigation and cleanup process that takes place under the Resource Conservation and Recovery Act (RCRA) Corrective Action Process. Certain facilities that treat, store, or dispose of hazardous waste in Tennessee – like NSA Memphis – must receive a permit from the U.S. Environmental Protection Agency and the Tennessee Department of Environment and Conservation. These facilities must follow the Corrective Action process outlined in the RCRA permit to address sites of hazardous waste contamination. This process is summarized briefly in the box to the right. More detail is provided in Fact Sheet 8, *Typical Site Cleanup*.

Steps in the Corrective Action Process

- ▶ **RCRA Facility Assessment (RFA)**
Preliminary study of the facility to identify potential sites of hazardous waste contamination
- ▶ **RCRA Facility Investigation (RFI)**
Detailed technical evaluation of the sites identified in the RFA, determining nature and extent of the contamination
- ▶ **Corrective Measures Study (CMS)**
Detailed evaluation of remedy alternatives, and a recommendation made to address site contamination
- ▶ **Corrective Measures Implementation (CMI)**
Implementation and monitoring of the remedy selected in the CMS stage

The Corrective Action process at NSA Memphis has reached the Corrective Measures Study (CMS) stage. This is the stage where decision makers will identify and evaluate potential alternatives at sites where remediation (which may or may not include physical cleanup) is required. Decision makers at NSA Memphis include the Navy, Tennessee Department of Environment and Conservation, and U.S. Environmental Protection Agency.

What is a CMS? ...

A Corrective Measures Study first identifies potential remediation technologies for a site, then screens them to determine if they will work for the specific contaminants identified and the site conditions. The CMS evaluates the most feasible alternatives based on nine criteria. A recommendation is then made and presented to the public.

... and what is NOT a CMS? ...

The Corrective Measures Study is *not* the "cleanup step," but the step where alternatives for cleanup or remediation are reviewed. The CMS is *not* intended to select or choose the cleanup alternative, only to make a recommendation based on site-specific information. In some cases, the recommended alternative may not involve physical cleanup of contaminants.

Remediation vs. Cleanup

In this fact sheet, and in the environmental field in general, the words "remediation" and "remedy" are often used. Remediation is often thought of as "cleanup," but this can be misleading. "Cleanup" suggests action to remove contamination, and is one type of remediation. Remediation can also refer to other remedies that minimize or prevent exposure to contamination. Remedies can include capping (e.g., covering an area with clay or concrete to prevent rainwater from spreading soil contamination downward into groundwater), and institutional controls (e.g., fences or deed restrictions that prevent access and/or exposure to site contaminants). "Cleanup" may or may not be the best choice for a site, depending on the many factors evaluated during the CMS.

The Three Steps

A Corrective Measures Study follows three basic steps to review remediation alternatives for a site.

① IDENTIFY Potential Technologies

Decision makers review the data and reports generated during the earlier investigations. The goal is to find and list technologies that could work at the site. Selections are based on factors such as

- type of contaminant at the site.
- type of media involved (soil, groundwater, air, surface water and/or sediment)

Decision makers also draw on their own professional experience and familiarity with similar sites when identifying methods that might work. Their job is to identify several remediation methods that can achieve the corrective action objectives for each affected medium (such as groundwater) at the site.

Innovative technologies are encouraged, especially where other options are limited. However, unproven technologies may require secondary/backup remedies.

② SCREEN Potential Technologies

In this step, decision makers look more closely at the technologies that were identified in the first step. Their goal is to eliminate remedies that are impossible or impractical for the site, or that are unlikely to perform satisfactorily at the site or within a reasonable period of time. Factors reviewed in this step include:

- **Characteristics of the Site** – Information about the site is reviewed to identify conditions that may limit or promote the use of certain technologies. Information reviewed includes: the size and depth of the contaminated site, geologic characteristics (e.g., sandy or rocky soil), and geographic characteristics (e.g., hillside, forest, or lake).

For Example:

Several types of remedies could be identified as possible solutions for groundwater contamination.

- **"Pump and Treat"**: Water can be pumped out, and the contaminants removed before sending the water to the municipal water treatment plant.
- **Bioremediation**: Microorganisms can be introduced that "eat" specific chemicals.
- **Institutional Controls**: Restrictions could be placed on use of the property or groundwater.
- **Natural Attenuation**: Natural processes are allowed to break down the contaminants. This remedy would be monitored closely to ensure progress.
- **Slurry Walls**: Physical barriers can be placed underground to prevent groundwater from moving beyond a certain point. This stops the groundwater and any contamination carried in it.

For Example:

Slurry walls are subsurface barriers made by filling a trench with a slurry mixture (soil, bentonite, and water). The thick mixture stops groundwater from moving further. Slurry walls are generally used where contamination is less than 50 feet deep. If the contaminated water is deeper than 50 feet, or if there are not clearly defined places where barriers would be effective (as is the case with NSA Memphis), this remedy would likely be screened out.

- **Characteristics of the Waste** – Does it move easily? Does it evaporate? Is the contamination in one large place or many small spots? Technologies clearly limited in their effectiveness by such characteristics should be eliminated from consideration.
- **Limitations of the Technology** – Each technology identified must be reviewed. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated. Decision makers may have to ask questions such as: Can the technology handle the volume of waste at the site? Does the technology have operating problems?

Impractical, unreliable, or unproven technologies may be excluded from further consideration at this point. Thus, only technologies that are technically feasible and practical are evaluated in the third step.

③ EVALUATE Potential Alternatives

Technologies that pass the screening step typically address one type of media each (e.g., soil or water), and are considered *potential alternatives*. Each alternative must be evaluated to see if it will achieve the corrective action objectives for that medium. Corrective Action objectives are set for each contaminated medium at a site. These are based on Federal and/or State standards and on risk to human health or the environment. Sites that are less complex may have only one potential alternative, and it may be a single technology. More complex sites may require that several technologies be combined into a single alternative to achieve the Corrective Action objectives.

This step is where potential alternatives are reviewed against nine criteria, described in the box below. Four of the nine are called *Primary Criteria* because they are tied to legal standards and must be met. The other five criteria are called *Secondary Factors* and must be objectively reviewed and considered in the decision.

PRIMARY CRITERIA

- 1 Protect Human Health and the Environment**
Cleanup may not be necessary to meet this criterion. For example, if surface soil is contaminated, preventing people from coming in contact with the soil (perhaps by building a fence) might be a solution.
- 2 Attain Cleanup Standards**
Corrective action objectives are set for each contaminated medium at a site, as described above. The chosen remedy must meet these objectives.
- 3 Control Source of Release**
The source may be an old, leaking tank, or it may be soil contaminated by the tank's leaking. "Control" could be removal of the source, or it could be covering the source so no more contamination is washed out.
- 4 Comply with Applicable Standards**
Applicable standards include federal, state, and local laws and regulations. There may be others – such as Navy standards – which could be more stringent.

SECONDARY FACTORS

- 5 Long-term Reliability and Effectiveness**
Some systems must run for many years, and their reliability and effectiveness should be considered, based on previous uses. In addition, factors such as maintenance, useful life, and flexibility of the remedy should be considered.
- 6 Reduction in Toxicity, Mobility and Volume**
An estimate must be made of how the remedy will affect the toxicity (harmful nature), mobility (movement), and volume (size) of the contamination.
- 7 Short-term Effectiveness**
Short-term effectiveness, short-term dangers (such as fire or exposure to hazardous materials), and other consequences (such as loss of habitat) must be evaluated.
- 8 Implementability**
Reviews the technical and administrative ease with which the method can be implemented.
- 9 Cost**
Calculates the estimated cost of preparing and implementing the remedy, including labor, maintenance, and other costs.

Evaluation of potential remedies for sites at NSA Memphis will occur after the technologies have been identified and screened for feasibility. Once the evaluation process is complete, one remedy (or combination of remedies) will be recommended for each site as the *preferred* alternative.

Public Involvement at NSA Memphis

◆ In the Corrective Measures Study

After the CMS evaluation process is complete, the alternatives evaluated (including a recommendation, will be announced to the public and a public comment period will be provided. Public concerns are always considered before a final decision is made.

◆ Restoration Advisory Board

The Restoration Advisory Board is a group of citizens, Navy, city, Tennessee Department of Environment and Conservation, and U.S. Environmental Protection Agency personnel that meets regularly to discuss progress on the environmental program at the base. These meetings are open to the public and attendance is strongly encouraged.

◆ Information Repository

Information repositories are collections of documents that include work plans, reports, and the Community Relations Plan. These document collections have been established as part of the Navy's program to inform the residents of Millington and surrounding communities about the environmental program at the base. Repositories can be found at two locations, listed to the right.

INFORMATION REPOSITORIES

Shelby County Public Library
Millington Branch
4858 Navy Road
Millington, TN 38053

◆ Mailing List

NSA Memphis also maintains a mailing list of interested organizations and individuals who receive regular updates on the environmental program.

NSA Memphis Library
South 78 Building
NSA Memphis
Millington, TN 38054

For More Information

Public Affairs Office
NSA Memphis
7800 Third Avenue
Millington, TN 38054-5045
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If you have any questions about the environmental program, public involvement activities (including the Restoration Advisory Board), or would like to be added to the mailing list, please contact the Public Affairs Office at the address or telephone number provided in the box to the left.